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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,517	04/02/2003	Stephen I. Mann	0382.1450000	7824

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EXAMINER	
TRINH, SONNY	
ART UNIT	**PAPER NUMBER**
2685	

DATE MAILED: 09/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,517	MANN, STEPHEN I.	
	Examiner	Art Unit	
	Sonny TRINH	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04/02/03*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/22/03,7/03/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. **Claim 3** recites the limitation "frequency divider" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1, 4-5, 9-10** are rejected under 35 U.S.C. 102(e) as being anticipated by Griffith et al. ("Griffith"; U.S. Patent Number 6,078,628).

Regarding **claim 1**, Griffith discloses an amplification system for a radio transmitter (abstract, column 2) comprising:

a processing subsystem which determines envelope information and phase information from a baseband input signal (abstract, column 2),

a phase modulator which generates a substantially constant amplitude signal having phase determined by the phase information (abstract, column 2),

an envelope modulator which generates an amplitude modulation signal determined by the envelope information (abstract, column 2), and an amplifier which generates an output signal from the constant amplitude signal, and the amplitude modulation signal (abstract, column 2), and wherein the phase modulator includes a quadrature modulator (figures 2A-2B, 3A, see also descriptions).

Regarding **claims 4-5**, Griffith further teaches the processing subsystem modifies the envelope information according to Cartesian feedback from the output signal from the amplifier and the processing subsystem modifies the phase information according to Cadesian feedback from the output signal from the amplifier (column 4, lines 52-67, figure 3A).

Regarding **claim 9**, this claim specifies the digital subsystem in addition to the limitations specified in claim 1. The digital subsystem is also taught by Griffith (column 2, "digital filters", claim 2). Therefore, claim 9 is rejected for the same reasons as given in the rejection of claim 1.

Regarding **claim 10,** Griffith further teaches the Cartesian feedback (column 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 2, 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffith et al. ("Griffith"; U.S. Patent Number 6,078,628).

Regarding **claim 2**, Griffith discloses the invention but does not explicitly disclose that the envelope modulator includes a pulse width modulator. However, pulse width modulation technique is a well known modulation technique and would have been obvious for a person of ordinary skill in the art to use a pulse width modulator since it is the most efficient form of envelope remodulation by varying the power supply voltage to the power amplifier. This is also known as high-level amplitude modulation (AM), and is most efficiently accomplished by means of pulse width modulation.

Regarding **claim 8**, Griffith discloses the invention but does not explicitly disclose that the amplifier is part of the phase modulator. However, phase modulator can be very small when made from semiconductor materials, such as InP and GaAs, and can be easily integrated with driving RF amplifiers on the same chip and the Examiner takes Official notice of such integration so that the circuitry can be minimized.

4. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Griffith et al. ("Griffith"; U.S. Patent Number 6,078,628) in view of Kahn ("Kahn"; U.S. Patent Number 4,194,154).

Regarding **claim 7**, Griffith discloses the invention but does not disclose that the processing subsystem pre-distorts the phase modulation of the output signal by modifying the phase information.

In an analogous art, Kahn teaches the method and means for compensating for the limited bandwidth of antennas and antenna coupling networks and other high powered modulated wave equipment characterized by generating a modulated wave at a relatively low power level, passing the modulated wave through circuitry which imparts the required envelope and phase modulation to the modulated wave to compensate for said limited bandwidth characteristics and then amplifying the resulting wave in amplifiers which substantially maintain the said imparted envelope and phase modulation and which feed the limited bandwidth equipment. Kahn further teaches the steps of pre-distorting the phase modulation of the output signal by modifying the phase information (columns 5-6, specifically lines 60-66 of column 5).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, within the system of Griffith, the pre-distorting of the phase modulation of the output signal by modifying the phase information, as taught by Kahn, so as to provide a substantially linear amplification characteristic over the operating range of the arrangement.

5. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Griffith et al. ("Griffith"; U.S. Patent Number 6,078,628) in view of Perthold et al. ("Perthold"; U.S. Patent Number 6,314,142).

Regarding **claim 11**, Griffith discloses the invention but does not disclose that the digital processing subsystem pre-distorts at least one of the phase modulation and envelope modulation of the output signal according to the Cartesian feedback.

In an analogous art, Perthold teaches the pre-distortion for a non-linear transmission path in the high frequency range (abstract).

Perthold further teaches the pre-distortion of at least one of the phase modulation and envelope modulation of the output signal according to the Cartesian feedback (column 7, specifically lines 30-55).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, within the system of Griffith, the pre-distorting of the envelope modulation of the output signal according to the Cartesian feedback, as taught by Perthold, in order to reduce the power amplifier non-linearities.

6. **Claims 6, 12-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffith et al. ("Griffith"; U.S. Patent Number 6,078,628) in view of Cox et al. ("Cox"; International Application number WO 97/30521).

Regarding **claim 12**, Griffith discloses an amplification system for a radio transmitter comprising:

a digital processing subsystem which determines envelope information and phase information from a baseband input signal (abstract, columns 2-4);

a phase modulator which generates a substantially constant amplitude radio frequency (RF) signal having phase determined by the phase information (abstract, columns 2-4); an envelope modulator which generates an amplitude modulation signal determined by the envelope information (abstract, columns 2-4); an amplifier which generates an RF output signal from the constant amplitude signal and the amplitude modulation signal (abstract, columns 2-4).

However, Griffith does not disclose a pre-distorter in the digital processing system that distorts at least one of the phase information and the envelope information according to feedback from the output of the amplifier.

In an analogous art, Cox teaches a linear transmitter using pre-distortion (abstract), Cox further teaches the pre-distortion that distorts of at least one of the phase modulation (page 3, line 27 to page 5 line 9).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, within the system of Griffith, the pre-distorting of the envelope modulation of the output signal according to the feedback, as taught by Cox, in order to reduce the power amplifier non-linearities.

Regarding **claim 13**, Cox further discloses that the pre-distorter is coupled to the phase modulator (figure 1, see detailed description).

Regarding **claim 14**, Cox further discloses that the feedback includes inphase and quadrature components derived from the output of the amplifier (figure 1, see description).

Regarding **claim 6**, Cox further teaches that processing subsystem pre-distorts the phase modulation of the output signal according to the envelope information and feedback from the output signal (pages 3-5, see also figure 1).

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sonny TRINH whose telephone number is 703-305-1961. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed URBAN can be reached on 703-305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SONNY TRINH
PRIMARY EXAMINER

30 August 2004